(No Model.) 2 Sheets—Sheet 1.

F. L. DODGSON.

PNEUMATIC SWITCH OPERATING DEVICE.

No. 514,119. Patented Feb. 6, 1894.

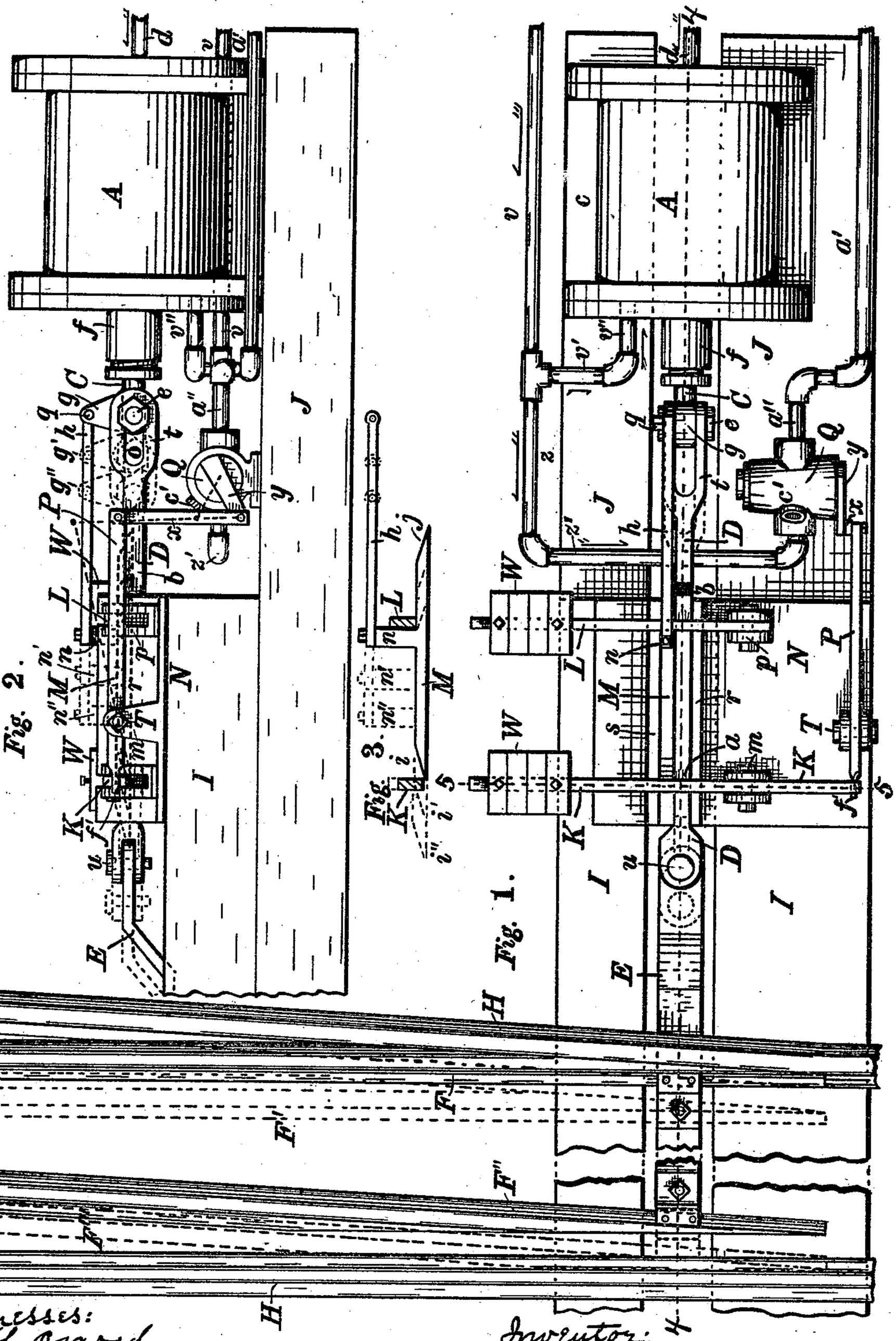

Fig. 2.

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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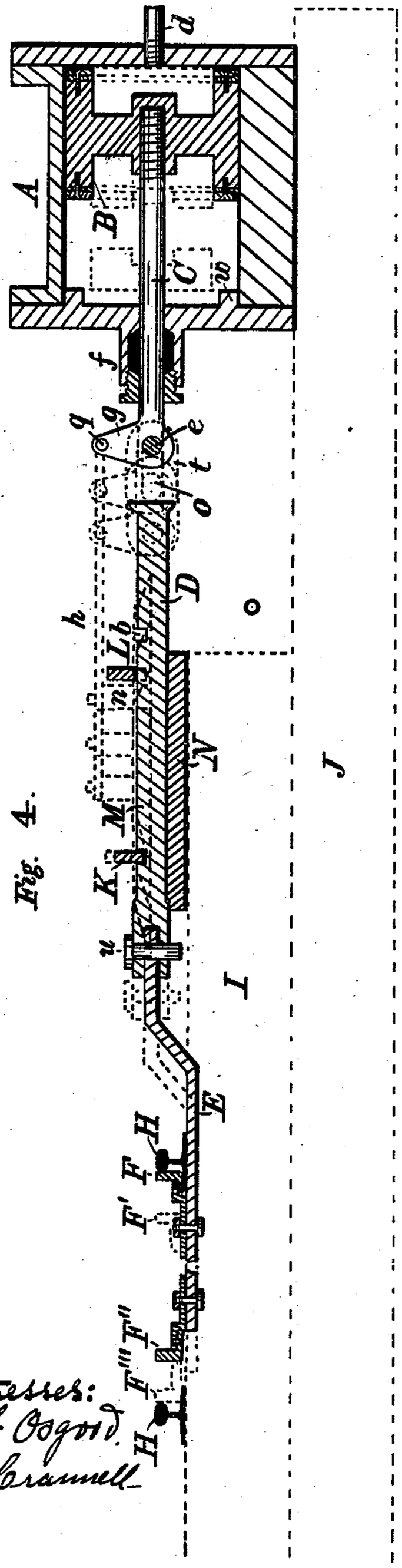

Fig. 4.

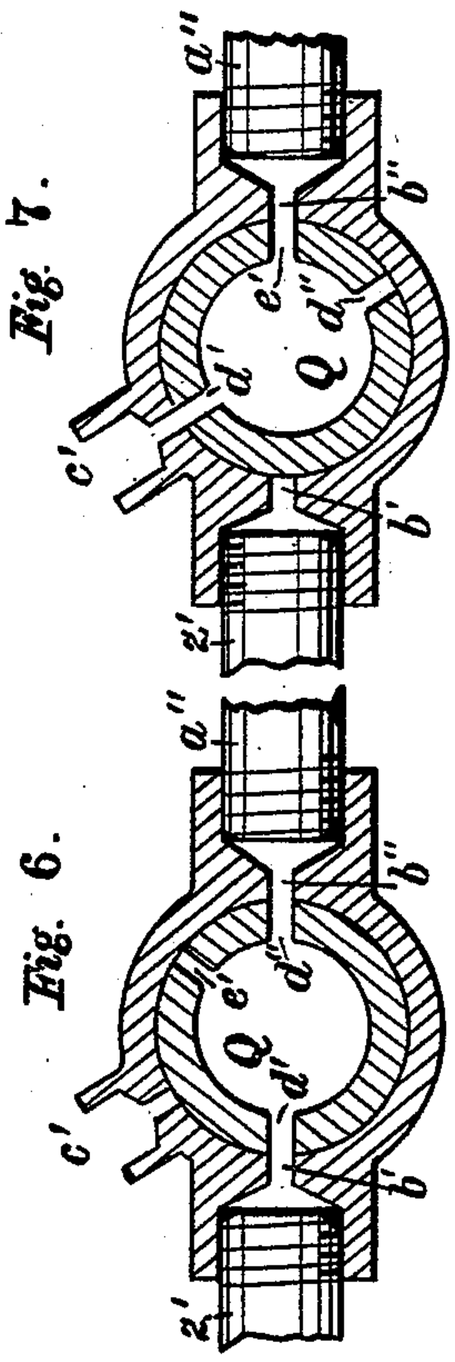

Fig. 7.

Fig. 6.

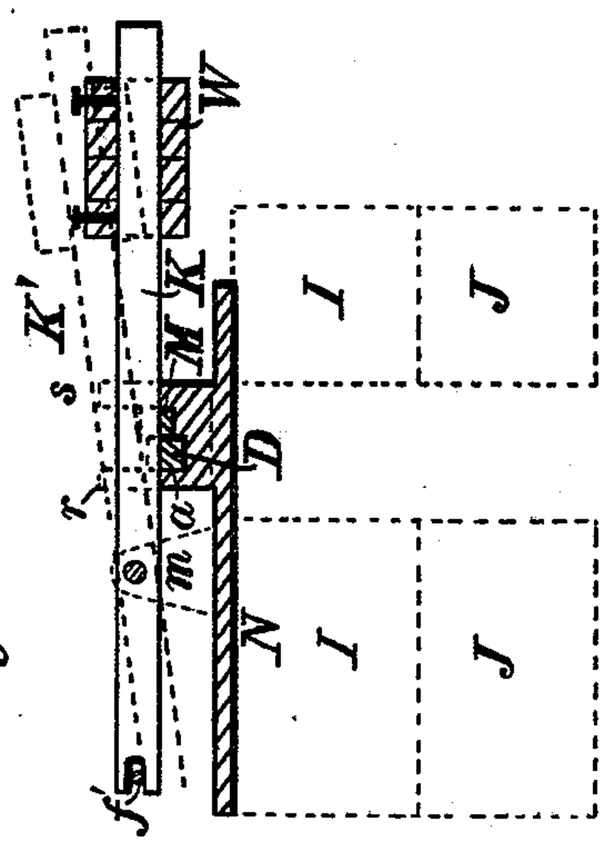

Fig. 5.

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UNITED STATES PATENT OFFICE.

FRANK L. DODGSON, OF ROCHESTER, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE AUTO-PNEUMATIC RAILWAY-SIGNAL COMPANY, OF SAME PLACE.

PNEUMATIC SWITCH-OPERATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 514,119, dated February 6, 1894.

Application filed September 30, 1893. Serial No. 486,918. (No model.)

To all whom it may concern:

Be it known that I, FRANK L. DODGSON, a citizen of the United States, residing at Rochester, in the county of Monroe, in the State of New York, have invented certain Improvements in Pneumatic Switch-Operating Devices, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to certain improvements in operating railway switches by pneumatic pressure, which improvements are fully described and illustrated in the following specification and the accompanying drawings,—the novel features thereof being specified in the claims annexed to the said specification.

In the accompanying drawings representing my improvements—Figure 1 is a plan view of a switch and its operating mechanism. Fig. 2 is a side elevation of the operating mechanism. Fig. 3 represents the slide detached. Fig. 4 is a longitudinal section on the line 4—4, Fig. 1. Fig. 5 is a transverse section on the line 5—5, Fig. 1. Figs. 6 and 7 are transverse sections of the valve.

A represents the cylinder, provided with the piston B, connected by the piston rod C and bars D and E with the movable or switch-rails F F″.

H H represent the track-rails.

The whole apparatus is supported by and connected with the track by suitable transverse cross-ties or timbers I I J J.

The movement of the piston in the cylinder opens and closes the switch, as represented by the full and dotted lines in Figs. 1 and 4,—the switch being locked in either position by the weighted locking-levers K and L, engaging in notches in the bar E. The first portion of the movement of the piston is employed to unlock the bar D by raising the locking lever K by means of the beveled slide M. The switch is locked in its closed position, represented by the full lines in Fig. 1, by the lever K engaging in a notch *a* in the bar D. It is locked in the open position, in which case a train will pass onto a side-track, as represented by the dotted lines F′ F‴ in Fig. 1, by the lever L engaging in the notch *b* in the bar D.

The cylinder and piston are of any usual or preferred construction,—the piston being preferably packed with cup-leathers, as shown. The cylinder is provided with a suitable flange *c*, by which it is secured to the outer ends of the timbers J.

d is a pipe inserted in the outer cylinder-head, and through which air or other fluid under pressure is admitted to the outer end of the cylinder to move the piston inward or toward the track. The valve regulating this admission of pressure is controlled by the towerman or the person in charge of the switch. The piston rod C passes through the stuffing-box *f*, and is provided at its inner end with the pin *e*, engaging in the slot *o* in the bar D, and with the arm *g*, connected with the slide M by the rod *h*. When the piston begins its travel the pin *e* moves along in the slot *o*, without imparting motion to the bar D, but the arm *g* and rod *h* move the slide M, the beveled end *i* of which raises the locking lever K out of the notch *a* in the bar D, so that the latter is free to move, and to operate the switch, as soon as the pin *e*, has arrived at the inner end of the slot *o*. The lever K is pivoted at *m* in suitable lugs on the plate N attached to the timbers I I. The movement of the lever K is indicated by the full and dotted lines in Fig. 5,—the bar D being unlocked when the weighted end of the lever is raised, as shown by the dotted lines K′. At the completion of its inward movement, the notch *b* comes under the locking lever L, and it drops into the notch, thus locking the switch in its open position. The locking levers are provided with one or more weights, W, which may be made variable or adjustable in any suitable manner. The locking lever L is pivoted at *p*, to one or more suitable lugs on the plate N, in a manner similar to that adopted for the lever K. The plate N is provided with the flanges or ways *r* and *s*, between which the bar D and the slide M reciprocate. Suitable notches are cut in the flanges *r* and *s* for the locking levers. The slide M is provided with a lug or boss, *r*, to which the rod *h* is attached. The outer end of the rod *h* is se-

cured to the arm g by the pin or bolt q. The movement of the arm and slide to the point when the piston begins to move the bar D is represented at g', n', i', Figs. 2 and 3, and the completed movement at g'', n'' and i''. The slide M moves at first alone and then with the bar D. The outer end of the bar D is formed into a yoke t, which receives the end of the piston-rod, and contains the slot o for the pin e, which is provided with nuts or collars on its ends outside the yoke. At its inner end the bar D is provided with a yoke and pin u by which it is connected with the switch-bar E. The switch-rails are connected with the bar E by clamps, rivets or bolts in any ordinary or preferred manner. On the return stroke of the piston, air under pressure is admitted by the person in charge to the inner end of the cylinder through the pipes v, v', v''. The first portion of the movement of the piston, in this case, moves the pin e along in the slot o, without moving the bar D, until the slide M by its beveled end j has raised the lever L out of engagement with the notch b, after which the bar is moved, the switch is closed and locked in such position by the engagement of the lever K with the notch a,—the lever L riding on the bar D. The parts are now in position for a repetition of the operations of opening and closing the switch, and locking it in either position.

Provision is made for allowing the air from the pipe v'' to act on the whole surface of the piston in any suitable way,—as by providing the inner cylinder head with a rib or flange, w, Fig. 4, which prevents the piston from coming in contact with the head, and thus stopping up the opening of the pipe, which, on account of the stuffing box, is placed outside the center.

My improvement may also be used to operate a derailing point,—in which case the movable rail F″ and the bar connecting it with the rail F will not be used. The rail F in this case will be moved away from the rail H, as indicated by the dotted lines F′, so that a train will run off the end of the rail H,—an expedient sometimes adopted to enforce obedience to signals, and to prevent a worse result. When used to operate a derailing-point, the lever L and notch b may be omitted, but otherwise the construction remains the same. In order however to actuate a signal, which indicates that the derailing point is closed and the track safe, I employ a valve Q, which is operated from the lever K by the lever P, connection x and arm y. The construction of the valve will be understood from the sectional views, Figs. 6 and 7. The valve is connected with the pipe v by the pipes z z', Fig. 1. When the weighted end of the lever K is down, and the lever engaged in the notch a in the bar D, the passage through the valve is open, as indicated in Fig. 6. A pipe a' a'' leads from the valve to any suitable or preferred form of pneumatic-signal. When the weighted end of the lever K is raised, the other end is depressed, the lever P turns on its pivot T, and the valve is shifted from the position shown in Fig. 6 to that shown in Fig. 7. The air will now escape from the pipe a' a'' communicating with the signal, through the port c'.

The operation is as follows: When the air is let in through pipes v, v', v'', to the cylinder, it moves the piston to the outer end of the cylinder, the lever K drops into the notch a, which movement opens the passage through the valve Q, by shifting it from the position of Fig. 7 to that of Fig. 6, and admits the air through the pipes a' a'' to the signal, which it shifts to safety. The signal will then be maintained by the air-pressure at the safety position, until it is exhausted from the pipe a' a'' through the port c', or a valve in the pipe v under the control of the signal man. The valve is inclosed in a suitable casing attached to the timber J,—such casing being provided with the ports b' b''. These ports are diametrically opposite each other, and register with the ports d' d'' in the valve Q. The port d' registers with the port c, and the port e' with b'' in order to effect the exhaust. The levers K and P are jointed together in any suitable way. In the construction shown the end of P is reduced in size, as indicated at f', and fitted into a slot in the end of lever K. The lever P is pivoted at T to a lug or lugs on the plate N. The connection x is pivoted at one end to the lever P and at the other end to the arm y on the valve Q. The valve Q is made conical, and held to its seat by a screw or nut bearing on the inner end of the casing.

The arrangement of the valve and its operating mechanism is such that air is only admitted to the signal, when the track is safe for the main-line.

I claim—

1. The combination, with the movable switch-rail, of the cylinder and piston, the slotted and notched locking-bar, the weighted transverse locking-lever, and the beveled slide, adapted to unlock the bar by an independent movement, substantially as described.

2. The combination, with the movable switch-rail, of the cylinder and piston, the slotted locking-bar provided with two notches, the two weighted transverse locking-levers, and the beveled slide, adapted to unlock the bar by an independent reciprocating movement, substantially as described.

3. The combination, with the movable switch-rail, of the cylinder and piston, the slotted and notched locking-bar, the weighted transverse locking-lever, the beveled slide, adapted to unlock the bar by an independent movement, and the valve operated by the locking lever to admit air to a signal, substantially as described.

4. The combination, with the movable switch-rail F, of the cylinder A, piston B and rod C, the locking bar D provided with notch

a and slot *o*, the beveled slide M directly connected to the piston-rod, the weighted locking lever K, and a suitable supporting plate N, substantially as described.

5. The combination, with the movable switch-rail F, of the cylinder A, piston B and rod C, the locking bar D provided with notch *a* and slot *o*, the beveled slide M directly connected to the piston-rod, the weighted locking lever K, and a suitable supporting plate N, and the signal-valve Q, inlet-pipe *z'*, outlet pipe *a''*, and a suitable connection between the valve and the locking lever, substantially as described.

6. The combination, with the movable switch-rail F, of the cylinder A, piston B and rod C, the locking bar D provided with notches *a* and *b* and slot *o*, the weighted transverse locking-levers K and L, the beveled slide M, connected directly to the piston-rod, and adapted to unlock the bar by an independent movement in either direction, and a suitable supporting plate N, substantially as described.

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